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ABSTRACT

Field-dependent and field-independent cognitive styles of Chicano mothers were examined in relation to: (a) the role that cognitive styles play in determining individual differences in maternal teaching strategies; (b) the role of maternal teaching strategies as mediators of children's development of cognitive style; (c) the emergence of field dependence-independence as a coherent construct of cognitive style in young Chicano children; and (d) cognitive style sex differences in young Chicano children. Forty three Chicano mothers were observed, in their homes, teaching cognitive perceptual tasks to their own 5-year-old children, and each mother and child was administered a battery of measures to assess field dependence-independence. Among the results discussed was the finding that field-independent mothers used inquiry and praise as teaching strategies and field-dependent mothers more frequently taught through modeling. Also, the contrasting tendencies toward greater or less self-nonself segregation and their cognitive and personality sequelae enter into the mother's choice of teaching strategies. It was found that each mother teaches her young child using the type of strategy that is likely to stimulate in the child the development of a cognitive style similar to her own. In addition, a coherent construct of field dependence emerges somewhat earlier in female than in male Chicanos. (Author/SE)

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RESEARCH BULLETIN

MATERNAL TEACHING STRATEGIES AND FIELD DEPENDENT-INDEPENDENT COGNITIVE STYLES IN CHICANO FAMILIES

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Abstract

Hypotheses were derived from the most recent formulation of field-dependence theory, and tested, concerning (a) the role that cognitive styles play in determining individual differences in maternal teaching strategies; (b) the role of maternal teaching strategies as mediators of children's development of cognitive style; (c) the emergence of field dependence-independence as a coherent construct in young Chicano children; and (d) sex differences. Forty-three Chicano mothers were observed, in their homes, teaching cognitive-perceptual tasks to their own five-year-old children, and each mother and child was administered a battery of measures to assess field dependence-independence. Results were generally in line with the theory.

Maternal Teaching Strategies and Field Dependent-Independent Cognitive Styles in Chicano Families

Considering the apparent differences in modes of interaction between people with different cognitive styles (Witkin & Goodenough, 1977a), one would expect parents of contrasting cognitive styles to differ in the approaches they follow for teaching their own children. Conversely, it seems reasonable to expect, as cognitive style theory predicts (Goodenough & Witkin, 1977), that certain patterns of parental teaching behavior influence children's development of cognitive styles. Indirect evidence in support of these two general hypotheses comes from previous studies in three areas of cognitive styles research: (a) numerous studies have yielded cross-cultural differences in socialization that parallel differences in cognitive styles (see, for example, Holtzman, Díaz-Guerrero, Swartz in collaboration with Lara-Tapia, Laosa, Morales, Reyes Lagunes, & Witzke, 1975; also see Witkin & Berry, 1975, for a review); (b) a few studies have uncovered significant relationships of child-rearing practices and parental attitudes with children's cognitive styles (Goodenough & Witkin, 1977); and (c) a small body of research suggests that classroom teachers of

contrasting cognitive styles differ in their teaching approaches (Witkin, 1976; Witkin, Moore, Goodenough, & Cox, 1977).

Of the several cognitive style dimensions thus far identified in the research literature, field dependence-independence has received the most attention. In the most recent formulation of field-dependence theory, Witkin and his co-workers (Witkin & Goodenough, 1977b; Witkin, Goodenough, & Oltman, 1977) have presented a model of hierarchically ordered constructs representing dimensions of individual differences in varying degrees of specificity. The field-dependent and field-independent cognitive styles are considered to be one expression of a more general individual difference dimension. At one extreme of this dimension is greater degree of psychological differentiation, and at the other is less differentiation. Briefly stated, differentiation is conceived as a major formal property of an organismic system. A system which is more differentiated shows greater self-nonself segregation. In a less differentiated system, in contrast, there is greater connectedness between self and others. A system which is more differentiated is also characterized by greater segregation of psychological functions; that is, functions are more separate from each other and activities within each are more specialized.

It is assumed that a relatively high degree of self-nonself segregation leads to autonomy in psychological functioning,

whereas less segregation between self and nonself produces a tendency to rely primarily on external referents. The designation, field-dependent and field-independent cognitive styles, is now applied to the contrasting tendencies to rely primarily on external referents or on the self, respectively. The theory further assumes that degree of autonomy from external referents will show itself in perceptual and cognitive functioning as well as in interpersonal behavior. Thus, whether a person tends to rely primarily on one or the other referents is regarded to have two important consequences. First, it may affect the manner of processing information from the field--specifically, whether the individual will (a) restructure the field on his or her own through using internal referents as mediators or (b) accede to its dominant properties as given. A person who functions less autonomously would tend to adhere to the field as given, while a more autonomous individual would more likely "go beyond the information given," that is, "act on the field." "Acting on the field" may take different forms. It may entail breaking up an organized field so that its parts are experienced as discrete from the background, providing an organization to a field that lacks it, or imposing a different organization on a field from the one suggested by its inherent organization. Second, primary reliance on external referents is likely to increase the frequency

of opportunities for developing interpersonal competencies. Hence, field-dependent people are likely to develop greater interpersonal competence, and field-independent people are likely to show superior cognitive restructuring skills. The field dependence-independence cognitive style dimension is conceived as bipolar and neutral with regard to value, each pole having adaptive value in particular situations (Witkin & Goodenough, 1977b; Witkin, Goodenough, & Oltman, 1977).

Four sets of questions are addressed in this study. One set centers on the role that cognitive styles play in determining individual differences in maternal teaching strategies: Are maternal teaching strategies selected, organized, and controlled as a function of field dependent-independent cognitive styles? If that is the case, what strategies do relatively field-dependent and field-independent mothers employ to teach their own young children? Field-dependence theory provides the basis for making general predictions regarding how people with a field-dependent or field-independent cognitive style will behave in certain specific role relationships, such as teachers with students in the classroom and therapists with their clients (Witkin, Moore et al., 1977); and it seems that how individual differences in cognitive styles find expression varies as a function of the specific role relationships. Field-dependence theory, in its

present stage of evolution, does not yet provide, in this author's interpretation, precise hypotheses regarding the role that cognitive styles play in determining maternal teaching strategies. At least three different predictions seem possible--they need not be mutually exclusive, however. First, one may hypothesize that mothers will exhibit teaching behaviors reflective of their own cognitive styles, that is, that the contrasting tendencies toward greater or less self-nonself segregation and their cognitive and personality sequelae will enter into the mothers' choice of teaching strategies. Thus, in teaching their own children, field-independent mothers may restructure the field and act autonomously of external referents, whereas field-dependent mothers may adopt teaching strategies that reflect less self-nonself segregation.

A second type of prediction possible is that, regardless of their own cognitive styles, mothers will adopt teaching strategies that are likely to foster in their children the development of a particular cognitive style. Thus, mothers may encourage sex-typing in their children's development of cognitive style. The field-independent cognitive style carries with it characteristics traditionally associated with the male role, and in effect males tend to be more field-independent than females, although many females are more field-independent than many males (Witkin &

Berry, 1975). Hence, mothers may more frequently adopt with girls than with boys, strategies that "demand" from the child reliance on external referents and acceptance of the field as given, thereby encouraging girls to develop a field-dependent cognitive style. Or, considering that there appears to be a tendency for people of similar cognitive styles to feel greater attraction toward each other and to achieve, perhaps, greater progress in the goals of their interactions than persons mismatched on cognitive style (Witkin, Moore et al., 1977), one could predict that each mother, regardless of the child's sex, will adopt teaching strategies that stimulate her child to develop a cognitive style similar to her own style.

A third prediction possible is that mothers will adopt the teaching strategies that better meet each child's learning needs which emanate from his or her cognitive style (see Witkin, Moore et al., 1977). For example, we know that field-dependent children tend to perform poorly in learning tasks that lack clear structure (Goodenough, 1976; Shapson, 1977). Hence, whatever their own cognitive styles, mothers may use with field-dependent children teaching strategies that structure the field, so structuring is not required on the part of the child. One also must consider the obverse as a possibility--that the child's development of

given characteristics represents an adaptation to the mother's behavior. Indeed, whatever congruence is found between maternal teaching behavior and children's cognitive style may be the result of a transactional process of mutual adaptation (see Laosa, in press).

A second set of questions is focused on the role of maternal teaching strategies as mediators of children's development of cognitive styles: Do certain maternal teaching strategies influence children's development of field dependence-independence? Which teaching strategies seem most likely to foster the development of each cognitive style in children? For this set of questions, precise predictions can be derived from field-dependence theory. Whatever future research may reveal about biological contributions to cognitive styles (see Goodenough & Witkin, 1977), the evidence already available makes it clear that environmental variables play a very important role in the development of field dependence-independence. The early exploratory studies by Witkin and his co-workers on child-rearing practices and attitudes (Dyk & Witkin, 1965; Witkin, Dyk, Faterson, Goodenough, & Karp, 1962/1974) led to the hypothesis that child-rearing practices which encourage autonomous functioning foster the development of differentiation in general, and more particularly

of a field-independent cognitive style. In contrast, child-rearing practices which stress strict, dominant control, conformity and authority, and harsh punishment are likely to make for less differentiation and a more field-dependent cognitive style. More recent studies have added confirmatory evidence for this hypothesis (see Goodenough & Witkin, 1977, for a review), although a few did not conform to it (Goodenough & Witkin, 1977; Hoppe, Kagan, & Zahn, 1977). Therefore, it is hypothesized that children whose mothers use maternal teaching strategies which encourage autonomous functioning and cognitive restructuring will develop a relatively field-independent cognitive style. On the other hand, children whose mothers use teaching strategies which encourage the child to rely on external referents as sources of information and stress strict, dominant control, conformity to authority, and harsh punishment will develop a relatively field-dependent cognitive style.

To assess maternal teaching strategies, the maternal teaching observation technique was employed. It measures nine different dimensions of maternal teaching strategy (see Methods below). To examine the questions addressed here, these dimensions may be classified according to (a) the type of cognitive demand they are likely to make on the child as a learner, (b) the cognitive style

characteristics they reflect on the mother's part in her role as a teacher, or (c) according to their relative emphasis on strict, dominant control, conformity to authority, and harsh punishment. Of particular interest here are the types of cognitive demands that involve the contrasting tendencies to, on the one hand, function autonomously of external referents and restructure the field, and on the other, turn to external referents as sources of information and accede to the field's dominant properties.

Thus, inquiry as a maternal teaching strategy is likely to involve cognitive restructuring on the mother's part; and such inquiry is also likely to involve a "demand" on the child to engage in cognitive restructuring. Similarly the use of praise, in the context of the tasks employed here, is likely to reflect cognitive restructuring on the mother's part and encourage the child to "act on the field." Modeling, on the other hand, an enactive, concrete form of instruction, is likely to reflect a relatively low degree of self-nonself segregation; moreover, by using modeling as a teaching tool, she probably is encouraging her child to rely on others as sources of information in ambiguous situations. As for the use of visual cues as a teaching strategy, it provides organization to the material to be learned, so that structuring is not particularly called for in the child. With

regard to the relative emphasis of a given teaching strategy on dominant control, reliance on parental authority, and harsh punishment, the use of negative physical control certainly reflects such an emphasis, and it contrasts in this sense with such strategies as physical affection and positive physical control.

Two dimensions of the maternal teaching observation technique, negative verbal feedback or disapproval and directives, appear to be too multifaceted to enable unambiguous classification. Each may include in its domain acts of speech reflecting harsh punishment and dominant control as well as specific feedback encouraging the child to engage in cognitive restructuring. It is expected, therefore, that these two dimensions will exhibit nonsignificant or irregular patterns of relationship with field dependence-independence.

The third focus of the study centers on whether field dependence-independence is firmly established as a coherent cluster of measures in Chicano children as early as five years of age and in adult Chicano females. In line with differentiation theory, numerous studies in a wide variety of cultures indicate that field dependence-independence is well established as a coherent cluster of measures as early as <u>six to seven</u> years of

age (see, for example, Holtzman et al., 1975; also see Witkin & Berry, 1975, for a review). The evidence bearing on whether field dependence-independence is firmly established in children younger than six years is rather scanty, however, although it suggests two conclusions (Kogan, 1976): (a) at four to five years the various measures of field dependence-independence do not yet comprise a coherent cluster and (b) the construct emerges somewhat earlier in girls than in boys. The present study examines (a) whether the field dependence-independence dimension has emerged as a coherent cluster of measures in Chicano children by five years of age; (b) whether the dimension is firmly established as a coherent cluster of measures in adult Chicano females; and (c) the cross-subcultural generality, to Chicanos, of the finding that cognitive styles emerge somewhat earlier in girls than in boys.

Finally, the fourth focus of the study is on sex differences in mean level of field dependence-independence. Sex differences have been observed in a wide variety of cultural and subcultural groups (Witkin & Berry, 1975) and in numerous groups of varied social and educational backgrounds in the U.S. (Witkin, 1967). Males eight years and older tend to be more field-independent than females of the same age. Studies of sex differences in cognitive styles below the age of eight are few, however, and

their results appear contradictory and puzzling. In an early review, Witkin (1967) concluded that "sex differences may not exist below the age of eight" (p. 243). Several recent studies of preschool samples, on the other hand, have yielded higher levels of field-independence for girls than for boys, a difference which begins to reverse itself by age six (Coates, 1974a, b; Kogan, 1976; Witkin, Oltman, Raskin, & Karp, 1971). Such studies suggest that at least for Anglo-American and Black American children there is a sex difference at age five in the direction of greater field-independence in females.

Cross-cultural research findings suggest that sex differences in field dependence-independence may be a function of the position the group occupies along certain cultural dimensions relevant to socialization (Holtzman et al., 1975; Witkin & Berry, 1975). Sex differences in field dependence-independence appear more common in groups that stress social stratification, marked separation of sex roles, and pressure toward conformity (Goodenough & Witkin, 1977; Witkin & Berry, 1975). Chicanos as a group appear to possess such cultural characteristics to a greater degree than, say, Anglo-Americans (Martinez, 1977; Ramírez, Taylor, & Petersen, 1971). One would expect to find, therefore, a marked sex difference in field dependence-independence in Chicanos; and indeed it has

been found, in the direction of greater field independence in males (Ramírez & Price-Williams, 1974; Ramírez, Castañeda & Herold, 1974). But the relative salience of this socialization pattern, apparent in Chicano families, may have the effect of producing not only a marked sex difference in field dependence-independence, but also of producing it, in the same direction as it is found in adulthood, at an earlier age than in groups who do not evidence this particular socialization pattern so saliently. Hence, it is hypothesized that there will be a sex difference in Chicano children, in the same direction as that found for adults, at an earlier age than in groups who stress to a lesser degree such characteristics in socialization.

The reason for selecting Chicanos[1] as subjects for the study is threefold: (a) to test the generalizability of field-dependence theory to Chicanos, as this issue has become a focus of much interest in psychology and education (see, for example, Hoppe et al., 1977; Laosa, 1977; Ramírez & Castañeda, 1974); (b) the opportunity this group provides for testing the hypotheses regarding cultural factors; and (c) to test the general hypothesis that there is considerable heterogeneity within the Chicano socioculture with regard to maternal teaching strategies and cognitive styles.

Method

Subjects

Subjects were 43 Chicano mother-child dyads (20 boys, 23 girls). The children were in kindergarten in either of two public schools in Los Angeles, California. The mean age of the children was 69.81 months, *SD* = 4.36, and of the mothers 33.79 years, *SD* = 6.46. The fathers' occupational status ranged from service workers other than private household, to professional and technical (*M* = 4.37, *SD* = 1.33).[2] The mothers' occupational status ranged from housewives not employed outside the home (67%) through service workers other than private household, to professional and technical (*M* = 1.67, *SD* = 2.65). The mean number of years of formal education completed by the mothers was 8.79, *SD* = 3.39; and for the fathers 8.90, *SD* = 3.89. All but one of the families were intact. Ninety-eight percent of the mothers and of the fathers, respectively, were the biological parents of the child.

From the children in the two schools whose parents volunteered to participate, the sample was selected to be as representative as possible of Chicano families in the U.S. with regard to formal education level and occupational status. The families were

informed that the study was designed to learn more about how children learn and the conditions surrounding children's learning.

The Maternal Teaching Observation Technique

The maternal teaching observation technique (MTOT) was administered in the subjects' homes, using the subjects' home language, by two Chicano English-Spanish bilingual, female university students. They began collecting the present data after achieving exact interobserver agreement within one frequency point on every variable. Subjects were randomly assigned to observers.

Each subject was administered parallel forms A and B of the MTOT. Form A preceded Form B in order of administration; the interval between administrations of the two forms was approximately ten minutes. The MTOT, developed by this author, is as follows. The mother is given an assembled Tinkertoy model and all the disassembled parts necessary for making an identical model. (The parts of the assembled model are glued together to prevent their being taken apart, and the disassembled parts are "worked" in and out prior to using them with the subjects until none is unusually difficult for a child to fit into any other part.) The mother is asked "to teach" her child "how to make" a model like the one already assembled.[3] The observer manually records on a

protocol the frequency of occurrence of the following maternal behavior categories:

Inquiry: The mother asks the child a question or otherwise directs a verbal inquiry to the child.

Directive: The mother verbally commands the child to pursue a given course of action.

Praise: The mother praises, or otherwise verbally expresses approval of, the child or the child's activity or product.

Negative verbal feedback or disapproval: The mother verbally indicates to the child that a given course of action taken by the child is incorrect or that she is displeased with the child or the child's activity or product.

Modeling: The mother works on the model and the child observes. A behavior unit is considered complete (and a frequency point is recorded) every time the mother fastens together or unfastens two parts.

Visual Cue: The mother attempts to attract the child's attention toward a given aspect of the task by providing a visual cue. This category is limited to attempts to attract the child's attention by sliding, pushing, or lifting a part or portion of the model being assembled (but

short of fastening or unfastening any parts). The behavior unit is considered complete (and a frequency point is recorded) when the mother releases the part or portion of the model or otherwise moves her hand away from it. (More subtle visual cues, such as merely touching a part or pointing, were included initially as additional categories but are not included in this study because of their low interobserver agreement).

Physical affection: The mother makes physical contact with the child as an expression of a favorable feeling toward the child. (Because of very low frequency this variable was deleted from the analyses.)

Positive physical control: The mother manually controls the child's motor behavior to facilitate the child's solution of the task--e.g., turning the child's body toward the task; or restraining the child as the child tries to leave the task area.

Negative physical control: This category includes two classes of nonverbal behavior, both displaying mother's disapproval of the child's activity on the task or product: (a) an action that generally would be interpreted as physical punishment, e.g., slapping the child's hand, or (b) manually

restraining or controlling the child's motor activity as the child works on the task, in order to keep him or her from pursuing what the mother apparently perceives as action not conducive to learning or solving the task or not appropriate for that particular time--e.g., she takes or pushes the child's hand away from the task material; or she holds the child's arm as the child begins to reach for a Tinkertoy part.

For each parallel form, the observation is discontinued five minutes after the mother is signalled to begin teaching or when the task is completed, whichever occurs first. The observation time in seconds is recorded. Ratio scores are computed by dividing raw frequencies into observation time. These ratio scores are summed across the two parallel forms to yield summed-ratio scores.

The two parallel forms of the MTOT differ from one another only in the Tinkertoy models employed. Both models appear on page 5 of the Tinkertoy instruction and idea book (Questor Education Products, 1972). Form A employs the "Robot" and Form B the "Jet Airplane." They consist of 27 and 28 parts, respectively. Both are of approximately equal difficulty. The criterion for selecting these tasks and corresponding difficulty levels was

that maternal teaching behaviors would be elicited from the entire range of subjects by materials and activities of approximately equal degree of prior familiarity to all subjects (see Prior-exposure effect section below).

Reliability. In addition to interobserver agreement checks during training, two types of reliability estimates were obtained for the MTOT: (a) interobserver agreement during data collection and (b) consistency of MTOT scores across parallel forms. Spearman rank correlations were computed between the raw frequencies obtained simultaneously but independently by the two observers on each of ten mother-child dyads selected at random intervals during data collection. These rho coefficients of interobserver agreement during data collection were as follows (the first coefficient corresponds to Form A and the second to Form B; $n = 10$)[4]: $\rho = .83$ and .90 for inquiry, $\rho = .94$ and .96 for directives, $\rho = .72$ and .99 for praise, $\rho = .90$ and .95 for negative verbal feedback or disapproval, $\rho = .97$ and .98 for modeling, $\rho = .68$ and .88 for visual cue, and $\rho = .76$ for negative physical control. All thirteen coefficients were highly significant ($p < .001$ for nine coefficients and $p < .01$ for four; one-tail tests). Rho coefficients were not computed for the remaining

MTOT variables because both observers obtained zero frequencies; the interobserver agreement for these variables was 100%.

To determine the parallel-form consistency of MTOT variables, Spearman rank correlations were computed between the raw frequencies obtained on Form A and Form B. These rho coefficients were as follows (n = 43; one-tail tests); ρ = .75, $p < .001$, for inquiry; ρ = .63, $p < .001$, for directives; ρ = .47, $p < .005$, for negative verbal feedback or disapproval; ρ = .83, $p < .001$, for modeling; and ρ = .70, $p < .001$, for visual cue. Because of very low frequency, rho coefficients were not computed for the three remaining MTOT variables; nevertheless, the parallel-form consistency was high also for these variables, as reflected in mean frequencies (zero and near-zero) highly similar across forms. These results indicate that each MTOT measure is at least a moderately stable attribute of maternal behavior.

Prior-exposure effect. In eight of the homes there was a Tinkertoy set prior to the administration of the MTOT. To determine whether such prior exposure to the task material had an effect on the observed maternal teaching behaviors, correlations were computed between MTOT summed-ratio scores and whether there was a Tinkertoy set in the home prior to the MTOT administration. The coefficients were near-zero and not significant (n = 43, $p > .05$,

one-tail tests). There was no evidence, then, of any effect due to prior exposure to the task materials.

Field Dependence-Independence Measures

As measures of field dependence-independence the mothers were administered the Embedded Figures Test (EFT) and the Block Design Subtest of the Wechsler Intelligence Scale for Adults (WAIS:BD), and the children were administered the Chidren's Embedded Figures Test (CEFT), the Block Design Subtest of the Wechsler Intelligence Scale for Children (WISC:BD), and a human-figure drawing test (HFDT). Successful performance on these tests is considered to involve cognitive restructuring of the perceptual field, a major component of field independence; as such, they are taken to represent measures of the individual's level of psychological differentiation and relative position along the field-dependence-independence cognitive style dimension (Witkin & Goodenough, 1977b; Witkin, Goodenough, & Oltman, 1977). The tests were individually administered by bilingual (English-Spanish) trained examiners, using the subjects' home language. The mothers were tested in their homes and the children in their schools in distraction-free rooms.

Embedded Figures Test. The EFT (Witkin et al., 1971) consists of two parallel series of complex geometric designs and

a series of simple figures. Parallel Form A was used in this study. The designs and figures are presented on 7.6 x 12.7 cm cards. For each of 12 items the subject is shown first a complex design and then a simple figure for 15 and 10 sec, respectively. The simple figure is then removed from view and the complex design is exposed again. The task is to locate the outline of the simple figure, which is embedded in the complex design. The scores are the mean solution time per item and the number of incorrect solutions. The time limit is 180 sec per item. Higher scores indicate greater field dependence.

Children's Embedded Figures Test. The CEFT is a modification of the EFT, developed especially for use with young children (Witkin et al., 1971). The test procedures involve the administration of two series of items. For each item the subject is asked to locate the shape of a simple form--a triangle (Series 1) or a house (Series 2)--which is embedded in a complex design that represents a recognizable object. The complex designs are presented on 14 x 12.5 cm cards, and the simple forms are cut-out models of the two shapes. Responses to each item are scored as 1 or 0. A score of 1 is given for a correct response on the first attempt to locate the hidden shape. No time limit is imposed on

search time for finding the simple shape. Higher scores indicate greater field independence.

Block Design. For the WAIS:BD (Wechsler, 1955) and WISC:BD (Wechsler, 1949), subjects are given a set of multicolored blocks and then presented with colorful geometric designs of increasing complexity. Their task is to copy the reference designs by the appropriate arrangement of blocks within the allotted time period. For each design completed correctly within a time limit the subject receives a minimum score, with bonus points for more rapid correct performance. Raw scores were employed in the analyses. Higher scores indicate greater field independence.

Human figure drawings. For the human-figure drawing test the subject was given a short stack of blank 21.7 x 27.8 cm sheets of white paper and a pencil and asked to draw a person. Upon completion of the drawing the subject was asked to draw on a separate sheet a person of the sex opposite to that of the first-drawn figure (Laosa, Swartz, & Díaz-Guerrero, 1974; Laosa, Swartz, & Holtzman, 1973). The drawings were scored according to the Goodenough-Harris system (Harris, 1963). Because of the high Pearson correlation obtained between raw scores on the male and female figures (r = .89), raw scores on only one figure, the male, were selected for use in subsequent analyses.

Results

Tables 1 and 2 present the means and standard deviations for the MTOT and field dependence-independence variables, respectively.

Insert Tables 1 and 2 about here

Mann-Whitney U tests, computed to determine whether the MTOT summed-ratio scores differed significantly for mother-son and mother-daughter dyads, revealed no sex difference for any of the MTOT maternal behavior categories (Table 1). Independent-means t tests, computed to determine whether there were sex differences on the children's field dependence-independence measures, revealed that boys and girls differed significantly on the CEFT, $t(41) = 1.85$, $p < .05$, and near significantly on the BD, $t(41) = 1.32$ (one-tail tests). Boys obtained higher CEFT and BD scores than girls. There was no sex difference for HFDT scores.

Spearman rank correlations, computed among the three maternal measures of field dependence-independence, were all significant and moderately high: EFT time--EFT errors ($\rho = .50$, $p < .001$), EFT time--WAIS:BD ($\rho = -.72$, $p < .001$), and EFT errors--WAIS:BD ($\rho = -.44$, $p < .002$). The data thus indicate that these measures

of field dependence-independence form a coherent cluster of measures for Chicano women.

As can be seen in Table 3, the intercorrelations among children's measures of field dependence-independence are low, but positive; and they are somewhat higher for girls than for boys.

Insert Table 3 about here

Table 4 presents Spearman rank correlations of MTOT summed-ratio scores with the three measures of maternal field dependence-independence. As can be seen, the patterns of correlation are

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Insert Table 4 about here

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very similar for mother-son and mother-daughter dyads. MTOT:inquiry, MTOT:praise, and MTOT:modeling correlated significantly with each of the three maternal field dependence-independence measures. Relatively field-independent mothers obtained higher MTOT:inquiry and MTOT:praise scores, but lower MTOT:modeling scores, than relatively field-dependent mothers.

Table 5 presents Spearman rank correlations of MTOT summed-ratio scores with the three measures of children's field dependence-independence. The following three trends are evident for both boys

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Insert Table 5 about here

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and girls: There is an inverse relationship of both MTOT:visual cue and MTOT:negative physical control with children's field independence. There is, on the other hand, a direct relationship between MTOT:positive physical control and children's field independence. An exception to the trends is a near-zero correlation between MTOT:negative physical control and WISC:BD. The relationship between MTOT:visual cue and field dependence-independence is particularly strong for boys, although the trend is also evident for girls. Two trends are evident only for girls: Both MTOT:inquiry and MTOT:praise correlated positively with girls' field independence. An exception to the latter trend is a near-zero correlation between MTOT:praise and HFDT.

As expected, negative verbal feedback or disapproval and directives, because of their relatively global nature in relation to derivations from field dependence theory, failed to show a

coherent trend of relationships with the field dependence-independence measures.

Discussion

Maternal Teaching Strategies and Maternal Cognitive Styles

The present data indicate clearly that relatively field-dependent and field-independent mothers differed in the strategies they used to teach their own children. The results provide impressive support for the view that maternal teaching strategies are selected, organized, and controlled by mothers' own cognitive styles.[5] Relatively field-independent mothers were observed to use inquiry and praise as teaching strategies more frequently than did relatively field-dependent mothers. On the other hand, relatively field-dependent mothers more frequently taught through modeling.

The use of modeling, a relatively concrete, enactive mode of instruction, is likely to reflect a tendency toward field-dependence. On the other hand, the choice of inquiry and praise, a self-discovery approach to instruction, is likely to reflect a tendency toward field-independence. The present results thus provide support for the hypothesis that the contrasting tendencies toward greater or less self-nonself segregation and their cognitive and personality sequelae enter into the mothers' choice of teaching strategies.

These findings are harmonious with Moore's (1973, cited by Witkin, Moore et al., 1977), who found that field-independent classroom teachers used a self-discovery instructional approach more frequently than those who were field-dependent.

The present results further indicate that, also in line with their own cognitive styles, field-independent mothers use teaching strategies that are likely to stimulate in their children the development of a field-independent cognitive style, and field-dependent mothers approach teaching in a manner that is likely to foster in their children a field-dependent cognitive style. Inquiry as a teaching strategy is likely to place a "demand" on the learner to engage in cognitive restructuring and to "place distance" between self and nonself. Similarly, the use of praise, in the context of the tasks used here, is likely to encourage the child to approach problem-solving by "acting on the field." In contrast, teaching through modeling requires that the learner adhere to the field as given and rely on others as sources of information. Hence, the results support the hypothesis that <u>each mother teaches her young child using the type of strategy that is likely to stimulate in the child the development of a cognitive style similar to her own style</u>. Whether the child indeed develops a cognitive style similar to the mother's style

probably depends on a variety of other environmental as well as biological factors (see Goodenough & Witkin, 1977).

It is useful to place the latter finding against the backdrop of previous results that have indicated a tendency for people of similar cognitive style to feel greater attraction toward each other and to achieve, perhaps, greater progress in the goals of their interactions than persons mismatched on cognitive style (Witkin, 1976; Witkin, Moore et al., 1977). One basis for this tendency may be their shared interests. It is not difficult to see, for example, how the social orientation of field-independent persons could cause matched pairs, when they come together, to focus quite spontaneously on the same aspects of a situation at issue, thereby heightening the facility and enjoyment of their interaction. Other possible bases may lie in their shared personality characteristics and their similarity in modes of communication (Witkin, Moore et al., 1977). By encouraging her child to develop a cognitive style similar to hers, the mother may be laying the foundation, unwittingly through her manner of interaction, for a mutually satisfying and productive relationship with her offspring.

The results failed to support the hypothesis that mothers, regardless of their cognitive styles, adopt teaching strategies

that are likely to encourage sex-typing in their children's development of cognitive style. Recent findings indicating that traditional sex-role stereotypes are more evident in the behavior of field-dependent than field-independent people (Lockheed, 1977) suggest that field-dependent mothers, but not field-independent mothers, may encourage sex-typing in their children's development of cognitive style. This notion, which requires a research design different from the one employed in this study, warrants further investigation.

There was modest support for the hypothesis that mothers adopt the teaching strategies that better meet each child's learning needs which emanate from the child's cognitive styles. Trends indicated that mothers used visual cue, modeling, and negative physical control more frequently with field-dependent than with field-independent children. Because field-dependent people are particularly responsive to the dominant properties of the field and have difficulty separating the stimulus into its component parts and restructuring it, such teaching strategies as visual cue and modeling should constitute stimulus aids concordant with their learning characteristics. Indeed, previous research has revealed that when the material to be learned is presented with such stimulus aids as visual cues and modeling, field-dependent

and field-independent people are not likely to differ in their learning (Koran, Snow, & McDonald 1971; Shapson, 1977). It also appears that field-dependent and field-independent people differ in the types of social reinforcement that are most effective for them; specifically, field-dependent children seem to learn faster than field-independent children under conditions of social punishment, but not social reward (see Goodenough, 1976, for a review). The lack of stronger evidence in support of this hypothesis may be related to the additional finding that field dependence-independence, as we shall see below, was only just beginning to emerge as a coherent construct in these five-year-old children. Future research should test the hypothesis for older children with firmly established cognitive styles.

Finally, it should be noted that the variability in cognitive styles and maternal teaching strategies observed in the subjects speaks convincingly against the widespread assumption that Chicanos are homogeneous with regard to such variables.

Maternal Teaching Strategies as Mediators of Children's Development of Cognitive Styles

The pattern of correlations between maternal teaching strategy variables and children's field dependence-independence measures was not, in general, highly consistent across the three

measures of children's field dependence-independence. This finding contrasts sharply with that involving maternal cognitive styles, where the pattern of significant correlations between maternal teaching behavior and maternal field dependence-independence was highly consistent across the different measures of the cognitive style dimension. As we shall see in the next section below, this is exactly what one would expect based on the additional finding that field dependence-independence was only just beginning to emerge firmly as a coherent cluster of measures in these five-year-old Chicano children.

The present findings revealed trends conforming to the hypothesis that socialization practices which encourage strict parental dominance, coercive control, and harsh punishment are likely to make for greater field dependence (Dyk & Witkin, 1965; Goodenough & Witkin, 1977; Witkin et al., 1962/1974). Mothers who exercised negative physical control in teaching their children were more likely than mothers who did not use such control, to have children who scored relatively low on the CEFT and HFDT. In contrast, mothers who used positive physical control had children who scored in a relatively field-independent direction. The other trends obtained were, too, in line with field-dependence theory. Mothers who taught through modeling and visual cue were

more likely than mothers who did not use such strategies, to have field-dependent children. In contrast, mothers who used inquiry and praise were more likely to have daughters who scored in a relatively field-independent direction. As we saw above, inquiry and praise as maternal teaching strategies make the types of cognitive demands on the child that are likely to stimulate the development of cognitive restructuring skills and autonomous functioning--and hence the development of a field-independent cognitive style. On the other hand, modeling and visual cues, as well as negative physical control, as maternal teaching strategies make the types of cognitive demands on the child that are likely to stimulate reliance on external referents--and hence to stimulate development of a field-dependent cognitive style.

Although it is difficult to ascribe directionality with correlational data, taken together the results suggest that the maternal teaching strategies to which the child is exposed in the home may have an influence in determining which cognitive style the child develops. But one cannot entirely discard the possibility of the obverse--that the mother's behavior is an adaptation to characteristics of the child--or that the process is, in effect, one of mutual adaptation (see Laosa, in press). Additional

research is required to illuminate further such reciprocal effects in development. Of particular value would be longitudinal studies beginning during the prenatal period.

Emergence of Cognitive Styles

A significant developmental question is at what point in ontogeny do the field-dependent and field-independent cognitive styles emerge firmly as a coherent construct? The present findings indicate that for adult Chicano females, the field dependence-independence measures used represent a coherent cluster of measures. The data thus carry evidence of construct validity for field dependence-independence in adult Chicano women. For the children, the intercorrelations among the measures were low, though positive, indicating that at five years of age field dependence-independence is beginning to emerge as a coherent construct in Chicano children.

For a deeper understanding of the emergence of cognitive styles in children additional studies are needed. Short-term longitudinal studies covering the preschool age period would be of particular value.

Sex Differences

The intercorrelations among the various field dependence-independence measures were somewhat higher for girls than for

boys, indicating that a coherent construct of field dependence-independence emerges somewhat earlier in female than in male Chicanos. A sex difference such as this has been found in samples of other cultural populations (Kogan, 1976). The present results thus extend to Chicanos the general finding that a coherent construct of field dependence-independence emerges somewhat earlier in females than in males.

There were also sex differences in mean level of field dependence-independence (CEFT and WISC:BD) for these Chicano five-year-olds, in the direction of greater field independence in boys. This finding thus confirms the hypothesis of a sex difference in Chicano children, in the same direction as that found at age eight and above, at an earlier age than in groups who stress to a lesser degree such characteristics in socialization as social stratification, marked separation of sex roles, and pressure toward conformity.

The one exception to the pattern of sex differences in field dependence-independence measures was the absence of a sex difference for the human-figure drawing test. This finding is not in conflict with previous studies, however. While it has been a repeated finding that, within each sex, persons who give evidence of a more articulated body concept as measured by human figure

drawings tend to be more field independent, it also has been repeatedly observed that females tend to earn higher articulation-of-body-concept scores than males. This sex difference may be less typical, however, in groups, such as the Chicano, with a relatively strong emphasis on "tightness" and conformity (see Witkin & Berry, 1975, for a review). Indeed, several longitudinal studies have reported higher human-figure-drawing test scores in females than in males for Anglo-Americans eight years and older (Faterson & Witkin, 1970; Harris, 1963; Laosa et al., 1973), and a cross-cultural longitudinal study of Mexican and Anglo-American school-children revealed that the sex difference was less pronounced in Mexican than in Anglo-American children (Laosa et al., 1974). The absence of a sex difference in human-figure drawing scores may be an artifact of the elaboration of clothing and adornments in the drawings by female subjects (Faterson & Witkin, 1970). As Kogan (1976) concluded in his review, on the whole the longitudinal evidence for the human-figure drawing test in no way alters the pattern of coherence, consistency, and long-term stability that characterizes the field dependence-independence construct from the early school years through adulthood.

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Footnotes

[1]The term Chicano, or Mexican-American, as employed in this study refers to persons who were born in Mexico and now hold United States citizenship or otherwise live in the United States or whose parents or more remote ancestors immigrated to the United States from Mexico. It also refers to persons who trace their lineage to Hispanic or Indo-Hispanic forebears who resided within Spanish or Mexican territory that is now part of the southwestern United States.

[2]Occupational status of the fathers was measured using the following scale adapted from that employed by the U.S. Bureau of the Census: 1 = private household workers; 2 = service workers except private household; 3 = laborers and farmers; 4 = equipment operators; 5 = craftsmen, foremen, and kindred persons; 6 = sales, clerical, and kindred workers; 7 = small business owners, managers, or administrators; 8 = professional and technical; 9 = large business owners or managers. The same scale with an additional point (0 = housewife, does not work outside the home) was used to measure mothers' usual occupational status.

[3]In pilot testing the procedures it was found that "enseñar" in the Spanish version of the instructions was interpreted to mean "to show" and elicited somewhat different maternal

teaching strategies from the English ("to teach") instructions. "Hoy quiero que Ud. haga que _____ (niño) aprenda a hacer..." and "Today I would like you to teach _____ (child) how to make..." did not differ in the teaching strategies they elicited and therefore were used in the Spanish and English versions of the instructions, respectively.

[4]Because the observers also collected data on Anglo-American mother-child dyads that were excluded from all the other analyses presented in this study, the reliability sample included five Anglo-American mother-child dyads.

[5]I do not mean to imply that such choices are under the conscious control of the individual or that the individual is consciously aware of the psychological processes underlying her behavior.

Table 1

Summed-Ratio Scores Obtained by Chicano Mother-Son (n=20) and Mother-Daughter (n=23) Dyads on the Maternal Teaching Observation Technique (MTOT): Means and Standard Deviations

MTOT variables	Mother-son dyads	Mother-daughter dyads	$\frac{\chi^a}{\sigma}$
Modeling			
M	.110	.097	.16
SD	.108	.090	
Visual cue			
M	.099	.105	- .29
SD	.046	.046	
Directives			
M	.074	.080	- .39
SD	.062	.054	
Praise			
M	.064	.071	- .41
SD	.063	.063	
Inquiry			
M	.044	.052	.38
SD	.041	.069	

Table 1 continued

Negative verbal feedback or disapproval			
M	.021	.034	-1.78
SD	.018	.027	
Negative physical control			
M	.001	.002	- .99
SD	.003	.005	
Positive physical control			
M	.0	.0	---
SD	.001	.001	

[a] Unit normal deviate by which the significance of *U* was determined in the Mann-Whitney *U* test (McNemar, 1969) of the mean difference between mother-son and mother-daughter dyads. None of the *U* tests was significant beyond the .05 level (two-tail tests). Dashes indicate where a *U* test was not computed because of very low frequency.

Table 2

Means and Standard Deviations of

Field Dependence-Independence Measures for

Chicano Mothers and Children

	EFT solution time	EFT incorrect solutions	BD
Mothers (n=43)			
M	111.57	18.83	27.70
SD	41.48	11.82	6.80
	CEFT	BD	HFDT
Boys (n=20)			
M	9.15	6.40	16.05
SD	2.72	5.09	5.27
Girls (n=23)			
M	7.39	4.74	16.00
SD	3.43	3.03	5.20

Note. EFT = Embedded Figures Test; BD = Block Design; CEFT = Children's Embedded Figures Test; HFDT = human-figure drawing test.

Table 3

Spearman Rank Intercorrelations Among Measures of Field Dependence-Independence for Five-Year-Old Chicano Boys and Girls

	CEFT	BD	HFDT
CEFT		.21	.19
BD	.12		.06
HFDT	.34	.23	

Note. Coefficients above the main diagonal are for boys (n=20) and those below it are for girls (n=23). CEFT = Children's Embedded Figures Test; BD = WISC Block Design; HFDT = human-figure drawing test.

Table 4

Spearman Rank Correlations of Summed-Ratio Scores on the Maternal Teaching Observation Technique (MTOT) with Measures of Mothers' Field Dependence-Independence in Chicano Families

MTOT variables	EFT solution time	EFT incorrect solutions	BD
Inquiry			
Mother-son dyads	-.75***	-.43*	.49*
Mother-daughter dyads	-.35*	-.46*	.39*
All	-.50***	-.47***	.44**
Directives			
Mother-son dyads	-.30	-.10	.42*
Mother-daughter dyads	.15	.20	.09
All	-.07	.07	.19
Praise			
Mother-son dyads	-.80***	-.43*	.44*
Mother-daughter dyads	-.44*	-.48**	.50**
All	-.59***	-.46***	.43**

Table 4 continued

Negative verbal feedback or disapproval			
Mother-son dyads	-.16	-.05	.16
Mother-daughter dyads	.04	.23	-.02
All	.03	.08	-.04
Modeling			
Mother-son dyads	.46*	.62**	-.27
Mother-daughter dyads	.50**	.33	-.40*
All	.46***	.50***	-.31*
Visual cue			
Mother-son dyads	.03	.06	.17
Mother-daughter dyads	.12	.24	-.10
All	.03	.12	.04
Positive physical control			
Mother-son dyads	.18	.04	-.08
Mother-daughter dyads	.12	.38*	.14
All	.17	.22	.01

Table 4 continued

Negative physical control			
Mother-son dyads	.07	.30	.00
Mother-daughter dyads	.04	-.08	.04
All	.09	.11	-.07

Note. EFT = Embedded Figures Test; BD = WAIS Block Design; n = 20 and 23 for mother-son and mother-daughter dyads, respectively.

* $p < .05$, one-tail test

** $p < .01$

*** $p < .001$

Table 5

Spearman Rank Correlations of Summed-Ratio Scores on the Maternal Teaching Observation Technique (MTOT) with Measures of Field Dependence-Independence for Chicano Boys and Girls

MTOT variables	CEFT	BD	HFDT
Inquiry			
Boys	.06	.10	-.07
Girls	.34	.29	.13
All	.26	.21	.07
Directives			
Boys	-.22	-.01	-.11
Girls	.38*	-.14	.00
All	.11	-.09	-.04
Praise			
Boys	.00	-.07	-.19
Girls	.43*	.18	-.03
All	.23	.00	-.06

Table 5 continued

Negative verbal feedback or disapproval			
Boys	-.20	-.02	-.04
Girls	.15	-.06	.29
All	-.05	-.13	.15
Modeling			
Boys	-.24	.10	.01
Girls	-.32	.14	-.16
All	-.26*	.12	-.11
Visual cue			
Boys	-.40*	-.46*	-.14
Girls	-.17	-.20	-.19
All	-.28*	-.32*	-.18
Positive physical control			
Boys	.28	.28	.12
Girls	.19	.20	.19
All	.12	.19	.11

Table 5 continued

Negative physical control			
Boys	-.31	.02	-.30
Girls	-.36*	-.01	-.21
All	-.39**	-.02	-.22

Note. CEFT = Children's Embedded Figures Test; BD = WISC Block Design; HFDT = Human figure drawing test; n = 20 and 23 for boys and girls, respectively.

* $p < .05$, one-tail test

** $p < .01$